

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented) Thermoplastic copolyamide resulting from the reaction between at least one polyfunctional monomer satisfying the following general formula I:



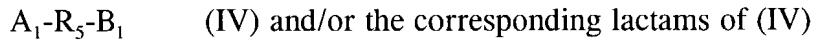
in which:

- n is an integer greater than or equal to 2,
- R_1 , R_2 may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, a cycloaliphatic radical, an aromatic radical, or a polymeric chain,
- A represents an amine or amine salt functional group, or an acid, ester, acid halide or amide functional group,
- B represents an amine or amine salt functional group when A is an acid, ester, acid halide or amide functional group, or B is an acid, ester, acid halide or amide function group when A is an amine or amine salt functional group,

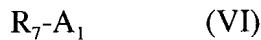
and at least one bifunctional monomer of the following formulae II to IV, and optionally, a monofunctional monomer of the following formulae V or VI; or a prepolymer obtained

from at least one bifunctional monomer of the following formulae II to IV and, optionally, at least one monofunctional monomer of the following formulae V or VI,

- the bifunctional monomers satisfying the following general formulae:



- the monofunctional monomers satisfying the following general formulae:



in which

- A_1 , B_1 may be identical or different and represent an acid, ester or acid chloride functional group, an amine functional group or an amine salt,

- R_3 , R_4 , R_5 may be identical or different and represent linear or branched alkyl hydrocarbon radicals or cycloaliphatic radicals optionally including unsaturated groups,

- R_6 , R_7 may be identical or different and represent aromatic, linear or branched, alkyl hydrocarbon radicals or alkylaryl arylalkyl or cycloaliphatic radicals optionally including unsaturated groups.

2. (Previously Presented) Copolyamide according to Claim 1, wherein the radical R is an aromatic radical.

3. (Previously Presented) Copolyamide according to Claim 1, wherein the molar ratio of the multifunctional monomers of formula I to the sum of the bifunctional monomers of formulae II, III, IV and monofunctional monomers of formulae V and VI is between 0.01 and 5.

4. (Previously Presented) Copolyamide according to Claim 1, wherein the monomer of formula I is a compound in which A represents the amine functional group, B represents the acid functional group, n is equal to 2, R represents an aromatic radical and R₁ and R₂ represent a covalent bond.

5. (Previously Presented) Copolyamide according to Claim 1 wherein the monomer of formula I is 5-aminoisophthalic acid.

6. (Previously Presented) Copolyamide according to Claim 1 wherein the monomer of formula I is 6-aminoundecanedioic acid.

7. (Previously Presented) Copolyamide according to Claim 1 having a melt flow index (MFI) of less than 5 g/10 minutes (measured at 275°C under a load of 2160 g).

8. (Previously Presented) Copolyamide according to Claim 1, having a molecular-mass distribution index D of greater than 2.

9. (Previously Presented) Process for manufacturing a copolyamide according to Claim 1, comprising adding, into the reaction mass containing bifunctional monomers of formulae II to IV and, optionally, monofunctional monomers of formulae V or VI, a predetermined amount of a multifunctional monomer of formula I and then in carrying out the polycondensation under the temperature and pressure conditions used for the polymerization of the linear polyamide which would be formed from the monofunctional monomers of formulae II to IV and, optionally, monofunctional monomers of formulae V or VI.

10. (Previously Presented) Process for manufacturing a copolyamide according to Claim 1, comprising synthesizing a prepolymer of a linear polyamide from one or more monomers of formulae II to IV and, optionally, monofunctional monomers of formula V or VI, in adding, to this said prepolymer in the solid state or in the melt, a predetermined amount of polyfuncitonal monomer and then making said polyfuncitonal monomer react with said prepolymer either in the solid state or in the melt.

11. (Previously Presented) Process according to Claim 10, wherein an amidification or polycondensation catalyst is added with the polyfuncitonal monomer.

12. (Previously Presented) Composition comprising, as matrix, at least one copolyamide according to Claim 1 and other components chosen from the group comprising

reinforcing fillers, filling fillers, antioxidants, stabilizers, pigments, colorants, fire retardants and moulding aids.

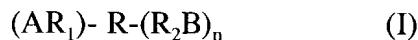
13. (Previously Presented) The thermoplastic copolyamide according to Claim 1, wherein n is an integer between 2 and 10, limits inclusive.

14. (Previously Presented) The copolyamide according to Claim 3, wherein the molar ratio is between .05 and 1.

15. (Previously Presented) Copolyamide according to Claim 1, wherein R is a polymeric chain containing hetero atoms.

16. (Previously Presented) Copolyamide according to Claim 1, wherein R is an aromatic radical comprising several aromatic rings and/or hetero atoms.

17. (Previously Presented) Thermoplastic copolyamide resulting from the reaction between at least one polyfunctional monomer satisfying the following general formula I:



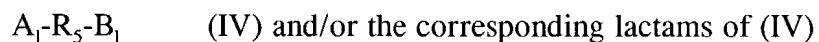
in which:

- n is an integer greater than or equal to 2,

- R_1, R_2 may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, cycloaliphatic radical, an aromatic radical, or a polymeric chain,
- A represents an amine or amine salt functional group, or an acid, ester, acid halide or amide functional group,
- B represents an amine or amine salt functional group when A is an acid, ester, acid halide or amide functional group, or B is an acid, ester, acid halide or amide functional group when A is an amine or amine salt functional group,

and at least one bifunctional monomer of the following formulae II to IV and optionally, a monofunctional monomer of the following formulae V or VI; or a prepolymer obtained from at least one bifunctional monomer of the following formulae II to IV and optionally, at least one monofunctional monomer of the following formulae V or VI,

- the bifunctional monomers satisfying the following general formulae:



- the monofunctional monomers satisfying the following general formulae;



in which

- A_1 , B_1 may be identical or different and represent an acid, ester or acid chloride functional group, an amine functional group or an amine salt,

- R_3 , R_4 , R_5 , R_6 , R_7 represent aromatic, linear or branched, alkyl hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals optionally including unsaturated groups;

wherein a molar ratio of the multifunctional monomers of formula I to a sum of the difunctional monomers of formulae II, III, IV and monofunctional monomers of formulae V and VI is between 0.01 and 5.

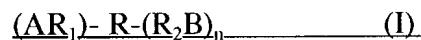
18. (Previously Presented) Copolyamide according to Claim 17, wherein the molar ratio of the multifunctional monomers of formula I to the sum of the difunctional monomers of formulae II, III, IV and monofunctional monomers of formula V and VVI is between 0.05 and 1.

19. (Previously Presented) Copolyamide according to Claim 17, wherein the radical R is an aromatic radical.

20. (Previously Presented) Copolyamide according to Claim 17, wherein the monomer of formula I is a compound in which A represents the amine functional group, B represents the acid functional group, n is equal to 2, R represents an aromatic radical and R_1 and R_2 represent a covalent bond.

21. (Previously Presented) Copolyamide according to Claim 17, wherein the monomer of formula I is 5-aminoisophthalic acid.

22. (Currently Amended) ~~Copolyamide according to Claim 17 Thermoplastic copolyamide resulting from the reaction between at least one polyfunctional monomer satisfying the following general formula I:~~



in which:

- n is an integer greater than or equal to 2.
- R₁, R₂ may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, cycloaliphatic radical, an aromatic radical, or a polymeric chain,
- A represents an amine or amine salt functional group, or an acid, ester, acid halide or amide functional group,
- B represents an amine or amine salt functional group when A is an acid, ester, acid halide or amide functional group, or B is an acid, ester, acid halide or amide functional group when A is an amine or amine salt functional group.

and at least one bifunctional monomer of the following formulae II to IV and optionally, a monofunctional monomer of the following formulae V or VI; or a prepolymer obtained

from at least one bifunctional monomer of the following formulae II to IV and optionally,

at least one monofunctional monomer of the following formulae V or VI,

- the bifunctional monomers satisfying the following general formulae:

$A_1-R_3-A_1$ (II),

$B_1-R_4-B_1$ (III),

$A_1-R_5-B_1$ (IV) and/or the corresponding lactams of (IV)

- the monofunctional monomers satisfying the following general formulae;

R_6-B_1 (V) and/or

R_7-A_1 (VI)

in which

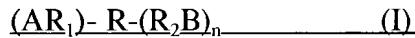
- A_1, B_1 may be identical or different and represent an acid, ester or acid chloride functional group, an amine functional group or an amine salt,

- R_3, R_4, R_5, R_6, R_7 represent aromatic, linear or branched, alkyl hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals optionally including unsaturated groups;

wherein a molar ratio of the multifunctional monomers of formula I to a sum of the difunctional monomers of formulae II, III, IV and monofunctional monomers of formulae V and VI is between 0.01 and 5, wherein the monomer of formula I is 6-aminoundecanedioic acid.

23. (Previously Presented) Copolyamide according to Claim 17, having a melt flow index (MFI) of less than 5 g/10 minutes (measured at 275°C under a load of 2160 g).

24. (Currently Amended) Copolyamide according to Claim 17 Thermoplastic copolyamide resulting from the reaction between at least one polyfunctional monomer satisfying the following general formula I:



in which:

- n is an integer greater than or equal to 2,
- R₁, R₂ may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, cycloaliphatic radical, an aromatic radical, or a polymeric chain,
- A represents an amine or amine salt functional group, or an acid, ester, acid halide or amide functional group,
- B represents an amine or amine salt functional group when A is an acid, ester, acid halide or amide functional group, or B is an acid, ester, acid halide or amide functional group when A is an amine or amine salt functional group,

and at least one bifunctional monomer of the following formulae II to IV and optionally, a monofunctional monomer of the following formulae V or VI; or a prepolymer obtained from at least one bifunctional monomer of the following formulae II to IV and optionally, at least one monofunctional monomer of the following formulae V or VI,

- the bifunctional monomers satisfying the following general formulae:

$\text{A}_1\text{R}_3\text{-A}_1$ (II),

$\text{B}_1\text{-R}_4\text{-B}_1$ (III),

$\text{A}_1\text{-R}_5\text{-B}_1$ (IV) and/or the corresponding lactams of (IV)

- the monofunctional monomers satisfying the following general formulae;

$\text{R}_6\text{-B}_1$ (V) and/or

$\text{R}_7\text{-A}_1$ (VI)

in which

- A_1 , B_1 may be identical or different and represent an acid, ester or acid chloride functional group, an amine functional group or an amine salt,

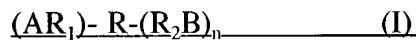
- R_3 , R_4 , R_5 , R_6 , R_7 represent aromatic, linear or branched, alkyl hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals optionally including unsaturated groups;

wherein a molar ratio of the multifunctional monomers of formula I to a sum of the difunctional monomers of formulae II, III, IV and monofunctional monomers of formulae V and VI is between 0.01 and 5, having a molecular-mass distribution index D of greater than 2.

25. (Previously Presented) Process for manufacturing a copolyamide according to Claim 17, further comprising adding, into a reaction mass containing bifunctional monomers of formulae II to IV and, optionally, monofunctional monomers of formula V or VI, leading to a linear polyamide, a predetermined amount of a multifunctional monomer of

of formula I and then in carrying out polycondensation under temperature and pressure conditions used for polymerization of said linear polyamide.

26. (Currently Amended) Process for manufacturing a copolyamide according to Claim 17 thermoplastic copolyamide, the process comprising reacting at least one polyfunctional monomer satisfying the following general formula I:



in which:

- n is an integer greater than or equal to 2,
- R₁, R₂ may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, cycloaliphatic radical, an aromatic radical, or a polymeric chain,
- A represents an amine or amine salt functional group, or an acid, ester, acid halide or amide functional group,
- B represents an amine or amine salt functional group when A is an acid, ester, acid halide or amide functional group, or B is an acid, ester, acid halide or amide functional group when A is an amine or amine salt functional group,

and at least one bifunctional monomer of the following formulae II to IV and optionally, a monofunctional monomer of the following formulae V or VI; or a prepolymer obtained

from at least one bifunctional monomer of the following formulae II to IV and optionally,
at least one monofunctional monomer of the following formulae V or VI,

- the bifunctional monomers satisfying the following general formulae:

$A_1-R_3-A_1$ (II),

$B_1-R_4-B_1$ (III),

$A_1-R_5-B_1$ (IV) and/or the corresponding lactams of (IV)

- the monofunctional monomers satisfying the following general formulae:

R_6-B_1 (V) and/or

R_7-A_1 (VI)

in which

- A_1, B_1 may be identical or different and represent an acid, ester or acid chloride functional group, an amine functional group or an amine salt,

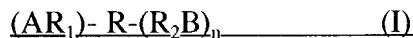
- R_3, R_4, R_5, R_6, R_7 represent aromatic, linear or branched, alkyl hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals optionally including unsaturated groups;

wherein a molar ratio of the multifunctional monomers of formula I to a sum of the difunctional monomers of formulae II, III, IV and monofunctional monomers of formulae V and VI is between 0.01 and 5; and, further comprising synthesizing a prepolymer of a linear polyamide from one or more monomers of formulae II to IV and, optionally, monofunctional monomers of formula V or VI, in adding, to said prepolymer in a solid state or in a melt, a predetermined amount of polyfunctional monomer and then in

making said polyfunctional monomer react with said prepolymer either in the solid state or in the melt.

27. (Previously Presented) Process according to Claim 26, wherein an amidification or polycondensation catalyst is added with the polyfunctional monomer.

28. (Currently Amended) Composition comprising, as matrix, at least one ~~eopolyamide according to Claim 17~~ thermoplastic copolyamide resulting from the reaction between at least one polyfunctional monomer satisfying the following general formula I:



in which:

- n is an integer greater than or equal to 2,
- R₁, R₂ may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, cycloaliphatic radical, an aromatic radical, or a polymeric chain,
- A represents an amine or amine salt functional group, or an acid, ester, acid halide or amide functional group,
- B represents an amine or amine salt functional group when A is an acid, ester, acid halide or amide functional group,

or B is an acid, ester, acid halide or amide functional group
when A is an amine or amine salt functional group,
and at least one bifunctional monomer of the following formulae II to IV and optionally, a
monofunctional monomer of the following formulae V or VI; or a prepolymer obtained
from at least one bifunctional monomer of the following formulae II to IV and optionally,
at least one monofunctional monomer of the following formulae V or VI,

- the bifunctional monomers satisfying the following general formulae:

A₁-R₃-A₁ (II),

B₁-R₄-B₁ (III),

A₁-R₅-B₁ (IV) and/or the corresponding lactams of (IV)

- the monofunctional monomers satisfying the following general formulae:

R₆-B₁ (V) and/or

R₇-A₁ (VI)

in which

- A₁, B₁ may be identical or different and represent an acid, ester or acid
chloride functional group, an amine functional group or an amine salt,

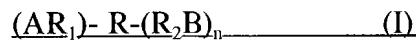
- R₃, R₄, R₅, R₆, R₇ represent aromatic, linear or branched, alkyl

hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals
optionally including unsaturated groups;

wherein a molar ratio of the multifunctional monomers of formula I to a sum
of the difunctional monomers of formulae II, III, IV and monofunctional monomers of
formulae V and VI is between 0.01 and 5 and other components chosen from the group

consisting of reinforcing fillers, filling fillers, antioxidants, stabilizers, pigments, colorants, fire retardants and molding aids.

29. (Currently Amended) Copolyamide according to Claim 17 Thermoplastic copolyamide resulting from the reaction between at least one polyfunctional monomer satisfying the following general formula I:



in which:

- n is an integer greater than or equal to 2.
- R₁, R₂ may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical.
- R is a linear or branched aliphatic radical, cycloaliphatic radical, an aromatic radical, or a polymeric chain.
- A represents an amine or amine salt functional group, or an acid, ester, acid halide or amide functional group,
- B represents an amine or amine salt functional group when A is an acid, ester, acid halide or amide functional group, or B is an acid, ester, acid halide or amide functional group when A is an amine or amine salt functional group.

and at least one bifunctional monomer of the following formulae II to IV and optionally, a monofunctional monomer of the following formulae V or VI; or a prepolymer obtained

from at least one bifunctional monomer of the following formulae II to IV and optionally,
at least one monofunctional monomer of the following formulae V or VI,

- the bifunctional monomers satisfying the following general formulae:

$A_1-R_3-A_1$ (II),

$B_1-R_4-B_1$ (III),

$A_1-R_5-B_1$ (IV) and/or the corresponding lactams of (IV)

- the monofunctional monomers satisfying the following general formulae;

R_6-B_1 (V) and/or

R_7-A_1 (VI)

in which

- A_1, B_1 may be identical or different and represent an acid, ester or acid chloride functional group, an amine functional group or an amine salt,

- R_3, R_4, R_5, R_6, R_7 represent aromatic, linear or branched, alkyl

hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals

optionally including unsaturated groups;

wherein a molar ratio of the multifunctional monomers of formula I to a sum

of the difunctional monomers of formulae II, III, IV and monofunctional monomers of

formulae V and VI is between 0.01 and 5, wherein R is a polymeric chain containing

hetero atoms.

30. (Previously Presented) Copolyamide according to Claim 17, wherein R is an aromatic radical comprising several aromatic rings and/or hetero atoms.